Sprint drives 45-times performance improvement

Transforming customer service with ultra-fast flash storage from IBM

Overview

The need

For exemplary customer service, Sprint Nextel call-center operatives need fast, reliable access to data on accounts, usage and billing. The existing storage infrastructure was no longer up to the task.

The solution

Sprint Nextel deployed nine IBM® FlashSystem™ 820 solutions with a total of 150 TB of enterprise multi-level cell (eMLC) flash, virtualized and managed through IBM System Storage® SAN Volume Controller.

The benefit

Delivers dramatic performance improvements, cutting latency by a factor of ten; reduces energy consumption; frees up at least six floor tiles in the data center versus the equivalent Tier-1 storage.

Sprint Nextel offers a comprehensive range of wireless and wireline communications services to consumers, businesses and government users. At the end of the first quarter of 2013, Sprint Nextel had more than 55 million customers and held the ACSI number-one ranking among national carriers for customer satisfaction. Newsweek ranked Sprint Nextel number three in both its 2011 and 2012 Green Rankings, the highest of any telecommunications company.

When it comes to customer satisfaction, Sprint Nextel is not content to rest on its laurels. The company is constantly investing in improving the speed and effectiveness of its customer service, in particular by accelerating processes in its 121 global call centers. To respond rapidly to customer queries and issues, call-center operatives need fast, always-on access to large volumes of data on customer accounts, usage and billing. As the company's customer base grew, the existing disk storage infrastructure could no longer meet expectations for performance, and capacity was running low.

Karim Abdullah, Director of IT Operations Enterprise Data Center Shared Services at Sprint Nextel, recalls: "Our goal is to meet and exceed end-user expectations around the performance and currency of data. As both the overall volume of data and the speed of incoming data increased, our existing Tier-1 storage was no longer delivering the performance we needed."

"We chose the FlashSystem 820 solutions based on the raw performance of flash, its reliability and the power savings versus spinning disks."

—Karim Abdullah, Director of IT Operations
Enterprise Data Center Shared Services,
Sprint Nextel

"With our first FlashSystem solutions, we got the latency down to 700 microseconds—almost exactly ten times faster than before."

—Dave Lounsberry, Storage Architect,
Sprint IT Enterprise Services

Slashing response times

To resolve this storage bottleneck, Sprint Nextel selected Texas Memory Systems RamSan solutions with enterprise multi-level cell (eMLC) flash. Following IBM's acquisition of Texas Memory Systems in 2012, the RamSan solutions were re-branded as IBM FlashSystem. The first application that Sprint Nextel moved to flash memory was a call-center system for phone activations. This was previously running on Tier-1 storage, with response times typically between six and eight milliseconds—and given the large number of transactions involved in each activation, this translated into noticeable delays.

"The administrator for the application wanted to achieve sub-millisecond latency," says Dave Lounsberry, Storage Architect, Sprint IT Enterprise Services. "With our first FlashSystem solutions, we got the latency down to 700 microseconds—almost exactly ten times faster than before."

Continuing its adoption of flash storage, Sprint Nextel more recently purchased nine IBM FlashSystem 820 solutions providing total capacity of 150 TB. With minimum write latency of 25 microseconds and read latency of 110 microseconds, 525,000 Input/Output Operations Per Second (IOPS) and up to 5.5 GB per second of read bandwidth, the FlashSystem solutions offer blisteringly fast performance for critical databases and applications at Sprint Nextel.

"We chose the FlashSystem 820 solutions based on the raw performance of flash, its reliability and the power savings versus spinning disks," says Abdullah. "The ease of integrating the solution into our existing storage infrastructure was also a big selling point."

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   Sprint Nextel

Virtual tiering for storage

Sprint Nextel virtualized the FlashSystem 820s within its existing
IBM System Storage SAN Volume Controller environment, which now
manages approximately half of the company's 24 PB of stored data.

"In the past, we would spend a lot of time configuring and striping and
agreeing on what data goes where," says Lounsberry. "SAN Volume
Controller removes all of that work, saving us about four days of adminis-
tration each month. Application owners can now request their storage
from us, and get it about 30 minutes later."

Abdullah adds, "Our data needs to be readily accessible, and some of it
we need to keep for a long time, so tiering is vital. Using SAN Volume
Controller we have defined 0, 1, 2, and 3 tiers, with transparent and
non-disruptive migration of data between them. The integration means
that the FlashSystem 820s look like any other block-based storage device
on the network—just with dramatically better performance."

Fast and efficient

Sprint Nextel is now migrating its largest system—the billing data ware-
house—to the new FlashSystem 820s. "We get 80 percent of our process
data from a company that handles our billing," comments Abdullah.
"With IBM FlashSystem, we have seen a 45-fold acceleration in access
to that data. For any particular application, if we see hot spots, we can
just move it to flash and the problem is gone. The phone-activation appli-
cation is a great example of how better storage performance really helps
the business: the faster we can get the phones out there, the happier our
customers are."

Beyond the dramatic improvement in performance, Sprint Nextel is also
seeing environmental and operational cost benefits. Each FlashSystem
820 solution draws just 300 watts of electrical power—at least an order of
magnitude less than an equivalent array with conventional hard drives.

"We actually see and pay the energy bill, and I have a commitment to
the U.S. Department of Energy to reduce consumption in the six data
centers I oversee by 15 percent by the end of 2016," comments Abdullah.

"Switching to flash storage has certainly contributed to the 49 months of consecutive reductions we have achieved despite growing the infrastructure."

Compact and resilient

The FlashSystem 820 solutions are helping the IT team at Sprint Nextel meet targets for reducing the occupied footprint in the data centers. "I can fit five FlashSystem 820s in 5U of rack space; to achieve the same performance using Tier-1 disk, it would be three or four floor tiles," says Lounsberry. "One full rack of FlashSystem 820 would give us almost 1 PB of storage—that compactness has enabled us to free up at least six floor tiles versus a traditional Tier-1 solution offering the equivalent capacity and performance."

A key enabler for the rapid uptake of flash storage at Sprint Nextel has been the attractive pricing. "Flash is now roughly at the price per giga-byte that Tier-1 disk was two years ago," says Abdullah. "When you factor in the smaller physical footprint and lower energy consumption, the advantages of choosing flash as Tier-0 storage are even clearer. In the longer term, we even expect to reduce our software licensing costs by enabling databases to deliver the same or better performance while running on fewer CPUs."

In addition to being efficient and compact, the IBM FlashSystem solution is also highly resilient, with IBM Variable Stripe RAID™ technology providing system-level RAID 5 across modules, and with hot-swappable flash modules and multiple redundant interfaces.

Full speed ahead

Looking to the future, Sprint Nextel will continue to migrate the most performance-sensitive applications from Tier-1 spinning disk to flash storage. As the company looks to move its customers increasingly into self-service web channels for managing their accounts, high speed of access to data will become all the more important.

"Faster access to data through IBM FlashSystem is a key contributor to our leading position in customer care," says Abdullah. "The IBM FlashSystem solution also allows us to identify and address potential customer issues faster, helping us to maintain and build our subscriber numbers—which is absolutely the most critical metric in our industry."

For more information

Contact your IBM sales representative or IBM Business Partner, or visit us at: **ibm.com**/storage/flash

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